National Defense
Defence nationale

DEFENCE AND CIVIL INSTITUTE OF ENVIRONMENTAL MEDICINE

Canada

April 1986

DCIEM No. 86-C-20

ALTITUDE-CORRECTED AIR DIVING DECOMPRESSION TABLES AND MODIFIED TREATMENT TABLES FOR CFSAT EDMONTON

UNLIMITED
DISTRIBUTION
ILLIMITÉE

R.Y. Nishi

Defence and Civil Institute of Environmental Medicine
1133 Sheppard Ave. W., P.O. Box 2000
Downsview, Ontario, Canada M3M 3B9

DEPARTMENT OF NATIONAL DEFENCE - CANADA

ABSTRACT

Decompression tables designed for use at sea level can not be used directly when diving at reduced atmospheric pressures. Altitude-corrected standard air decompression tables, oxygen decompression tables, and repetitive diving tables, based on the DCIEM 1983 decompression model, have been developed for the Canadian Forces School of Aeromedical Training (CFSAT) at Edmonton, Alberta. These tables can be used directly since they have been calculated for the elevation of Edmonton. Treatment tables, which are designed for use at sea level, also can not be used directly at altitude. An analysis of treatment tables shows that the standard treatment tables, if dived exactly with air only as the breathing gas, are unsafe for the inside attendant and that oxygen breathing towards the end of the tables is necessary to reduce the risk of decompression sickness.

Table of Contents

Section 1. General 1
1. Introduction 1
2. Definition of Terms 1
Section 2. Instructions for Use 3
1. Standard Air Decompression 3
2. Oxygen Decompression at 30 fsw 3
3. Repetitive Diving Procedures 4
4. Descent/Ascent Rates and Variations 7
5. Flying after Diving 7
Section 3. Analysis of Treatment Tables 8

Appendix I - Standard Air Table 14
Appendix II - Oxygen Decompression at 30 fsw Table 18
Appendix III - Repetitive Dive Tables 22
Appendix IV - Worksheet for Repetitive Diving 24

SECTION 1 - GENERAL

1. INTRODUCTION

Decompression tables, based on the DCIEM 1983 decompression model, have been developed for use at **CFSAT Edmonton**. (The DCIEM 1983 model is the basis of the new **Canadian Forces Air Diving Tables**.) Since CFSAT Edmonton is at an elevation of 2200 ft, the reduced atmospheric pressure at the surface makes any dive done equivalent to a deeper dive at sea level. Thus the actual depth, the stop depths, and the descent and ascent rates must be corrected for the altitude if decompression tables developed for sea level conditions are to be used.

The decompression tables presented here have been calculated specifically for the elevation of CFSAT Edmonton and are designed to be used directly. No additional corrections are necessary for stop depths or descent and ascent rates. Depths are given in feet of seawater (fsw). All dives, with the exception of those at 30 fsw, are within the CF normal air diving limits. (The normal air diving limit at 30 fsw is 180 min.) The following **altitude-corrected** tables are included:

Table 1A. Standard Air Decompression,

Table 2A. Air with Oxygen Decompression at 30 fsw,

Table 3A. Repetitive Dive Groups,

Table 4A. Repetitive Dive Factors, and

Table 5A. Allowable Limits for No-decompression Repetitive Dives.

These tables are described and instructions for their use are presented.

The altitude also imposes limitations on standard Treatment Tables which have been developed for use at sea level. An analysis of USN Treatment Tables 5, 6 and 6A is presented in Section 3 with recommendations for modifying the tables to ensure the safety of the treatment attendants.

2. DEFINITION OF TERMS

a. Ascent Rate
A specified rate of travel that the divers must maintain up to and between decompression stops. For these tables, the ascent rate is 60 $\pm$ 10 fsw/min.

b. Bottom Time (BT)
The total elapsed time from when the diver leaves the surface to the time that he begins his ascent, measured in minutes.

c. Decompression Schedule
Specific decompression procedure for a given combination of depth and bottom time as listed in a decompression table; it is normally indicated as maximum depth (fsw)/bottom time (min).

d. **Decompression Stop**
Specific length of time which a diver must spend at a specified depth to allow for the elimination of sufficient inert gas from his body to allow him to safely ascend to the next decompression stop or the surface.

e. **Depth**
The maximum depth attained measured in fsw.

f. **Descent Rate**
The maximum rate of travel allowed in descending to the bottom. For these tables, the descent rate is 60 fsw/min or slower.

g. **Effective Bottom Time (EBT)**
For Repetitive Diving, the calculated Bottom Time for decompression purposes taking into consideration the residual nitrogen from the previous dive(s).

h. **No-Decompression Dive**
A dive which does not exceed the no-decompression limits in the Standard Air Tables.

j. **No-Decompression Limit**
The maximum bottom time which allows a direct ascent to the surface without requiring decompression stops.

k. **Repetitive Dive**
Any dive conducted within 18 hours of a previous dive or any dive that has a Repetitive Factor greater than 1.0.

m. **Repetitive Factor (RF)**
A figure determined by the Repetitive Dive Group and the length of the surface interval after a dive and used for Repetitive Diving.

n. **Repetitive Dive Group (RG)**
A letter which relates directly to the amount of residual nitrogen in a diver's body immediately on surfacing from a dive.

p. **Residual Nitrogen**
Nitrogen that is still dissolved in a diver's tissues after he has surfaced.

q. **Single Dive**
Any dive conducted more than 18 hours after a previous dive.

r. **Stop Time**
The tabulated decompression stop time which includes the traveling time to that stop at 60 fsw/min except for O_2 stops where the stop time commences after the divers are confirmed on O_2.

s. **Surface Interval (SI)**
The time which a diver has spent on the surface following a dive; beginning as soon as the diver surfaces and ending as soon as he starts his next descent.

SECTION 2 - INSTRUCTIONS FOR USE

1. STANDARD AIR DECOMPRESSION

The altitude-corrected **Standard Air** decompression table is presented in Table 1A (Appendix I) in the traditional tabular format of depth, bottom time, stop times and total ascent time. The minimum bottom time given for each depth is the no-decompression limit. The procedure for Standard Air decompression is:

a. descend at 60 fsw/min or slower; and

b. ascend at 60 fsw ± 10 fsw/min to the indicated stops and remain at each stop for the tabulated time. (The stop time at each stop includes the ascent time to that stop.)

Example 1:

Dive 104 fsw/22 min.
Standard Air Table calls for Schedule 110 fsw/25 min.
Decompression required:
20 fsw - 8 min stop, (travel time to 20 fsw is 1.4 min, actual stop time is 6.6 min, for a total time of 8 min)
10 fsw - 12 min stop.

2. OXYGEN DECOMPRESSION AT 30 FSW

The altitude-corrected **O_2 Decompression** table is presented in Table 2A (Appendix II). Decompression stops on air to and including 40 fsw are identical to the Standard Air table. Only the air stop times include the ascent time to the stop. At 30 fsw, the O_2 decompression time listed starts when the diver is confirmed on O_2 and does not include the ascent time to 30 fsw. O_2 is breathed until the decompression requirements are satisfied and ascent to the surface is made directly. The O_2 decompression procedure reduces the total decompression time by 35-40% over the Standard Air method. The procedure for the oxygen decompression method is:

a. ascend normally as for Standard Air to 30 fsw and stop;

b. switch the diver's gas to O_2; the diver remains on O_2 at 30 fsw for the full tabulated stop time. This stop time commences once the Diver is confirmed on O_2; and

c. ascend to the surface at 60 ± 10 fsw/min.

Example 2:

Dive 75 fsw/48 min.
Table 2A calls for Schedule 80 fsw/50 min
Decompression required:
Ascent time to 30 fsw - 0.75 min
30 fsw - 15 min stop on O_2 (do not include travel time)
Ascent to surface

3. REPETITIVE DIVING PROCEDURES

The calculation of repetitive dives require the use of three tables (Appendix III). These tables, which have also been corrected for the altitude, can be used for both Standard Air dives and Oxygen Decompression dives. Repetitive dives do not necessarily have to be from the same decompression table as the first dive, e.g., the first dive can be a Standard Air dive and the second can be one where oxygen decompression at 30 fsw is used.

Table 3A gives **Repetitive Dive Groups** for selected dive profiles from 30 to 170 fsw. The **Repetitive Groups (RG)** range from **A** to **J**. (*Note that these Repetitive Groups are different from and thus incompatible with the Repetitive Groups of the US Navy Tables.*) For example, the **RG** for a dive to 60 fsw for 30 min is **E**. From 70 to 160 fsw, bottom times are given in 5-minute minimum increments. Hence, not all **RG**'s have a corresponding bottom time in this depth range. (Where there is no entry for an **RG**, always select the next highest **RG** which has an entry. For example, a dive to 150 fsw for 12 min would have **RG = G**. Do not interpolate.)

Table 4A presents **Repetitive Dive Factors** for each **RG** and for **Surface intervals (SI)** to 18 hours. These **Repetitive Factors (RF)** are used to calculate the **Effective Bottom Time (EBT)** of the repetitive dive. The **EBT** is the combined total of the actual bottom time and the time that must be considered to have been already spent at that depth because of the residual nitrogen remaining in the body from the previous dive. Multiple dives can be performed if the **RG** of the **EBT** and the depth of the second dive is used as that of a **first** dive to find a new **RF** and so on.

In Table 5A, the **allowable limits for no-decompression repetitive dives** are shown for each depth as a function of the Repetitive Factor. Note that these times are **actual bottom times** and not **EBT**'s. The right hand column gives the **RG** for the bottom times listed in the table for each depth. Thus, with this table, calculations are unnecessary if only no-decompression repetitive dives are planned. For any repetitive dive, this table should be consulted to determine whether the planned dive can be done as a no-decompression dive or whether decompression will be required.

The procedure for using the three repetitive dive tables is as follows. (A worksheet to assist in calculating the decompression requirements for repetitive dives is given in Appendix IV.)

a. Find the **Repetitive Group (RG)** of the **first dive** from Table 3A.

b. Find the **Repetitive Factor (RF)** from Table 4A under the appropriate **Surface Interval (SI)**.

c. Determine the maximum time allowed for a no-decompression second dive from Table 5A under the **RF** found in Step b.

d. If the **actual bottom time** of the second dive is **less than or equal** to the limit found in Step (c), the dive can be done with no decompression requirements. (If another repetitive dive is required, multiply the actual bottom time of the second dive by the **RF** found in Step (b) to obtain the **EBT** of the second dive.)

e. If the **actual bottom time** of the second dive is **greater** than the limit found in Step (c), multiply the actual bottom time by the **RF** found in Step (b) to obtain the **EBT** of the second dive. Decompress according to the schedule for the **depth** and **EBT** of the second dive.

f. If another repetitive dive is required, obtain from Table 3A the **RG** of the second dive from the **depth** and the **EBT** found in Step (d) or Step (e). Repeat Steps (b) through (e).

Example 3:
A medical officer accompanies a patient to 165 fsw on Treatment Table 6A. He leaves 165 fsw within five minutes of leaving surface and returns to the surface with no-decompression stops required. Forty-five minutes later, he is required to attend to the patient again at 60 fsw. (This example is shown in Figure 1.)

(i) How long can he stay at 60 fsw and still return to the surface without requiring decompression stops?

1. First dive - 165 fsw for 5 min; **RG = C** (Table 3A).
2. **RF** for a surface interval of 45 min is 1.4 (from Table 4A).
3. From Table 5A, under **RF** = 1.4, 21 min at 60 fsw is allowed.

(ii) The medical officer requires only 10 min at 60 fsw and returns to surface with no decompression. One hour later, he must return to 60 fsw again. How long can he stay on this third dive?

1. Second dive was 60 fsw for 10 min with a **RF** of 1.4 (from (i) 2).
2. **EBT** of second dive = 1.4 x 10 = 14 min.
3. **RG** for second dive is **B** from Table 3A (60 fsw/14 min).
4. **RF** for third dive after a **SI** of 60 min is 1.2 (from Table 4A).
5. From Table 5A, under **RF** = 1.2, 25 min is allowed at 60 fsw for the third dive.

(iii) If the medical officer requires 35 min at 60 fsw for his third dive, what are the decompression requirements?

1. **RF** after the second dive is 1.2 (from (ii) 4).
2. **EBT** for third dive is 1.2 x 35 = 42 min.
3. Decompression required is 10 min at 10 fsw (from Table 1A), or 5 min on O_2 at 30 fsw (from Table 2A).
4. If another dive is required, **RG** for third dive is **H** from Table 3A (60 fsw/42 min).

g. **For Surface Intervals Less than 30 Minutes.**

(i) **If the first and second dives are in the same depth range**, add the bottom times of the first and second dives to obtain the **EBT** for the second dive.

REPETITIVE DIVING WORKSHEET

FIRST DIVE:

165 fsw/ 5 min

Repetitive Group C (Table 3A)

SECOND DIVE:

SI 0 hr 45 min; RF 1.4 (a) (Table 4A)

Depth 60 fsw

Allowable No-D Limit (Table 5A) 21 min

Actual Bottom Time 10 min

EBT 1.4 (a) x 10 (b) = 14 (c)

DIVE SCHEDULE: 60 fsw/ 14 (c) min

Decompression required: ☐ Yes ☑ No

_____fsw _____min

_____fsw _____min

_____fsw _____min O_2 Stop (If Table 2A)

_____fsw _____min _____fsw _____min

Repetitive Group_____ (Table 3A)

REPETITIVE DIVING WORKSHEET

~~FIRST~~ DIVE: SECOND

60 fsw/ 14 min

Repetitive Group B (Table 3A)

~~SECOND~~ DIVE: THIRD

SI 1 hr 00 min; RF 1.2 (a) (Table 4A)

Depth 60 fsw

Allowable No-D Limit (Table 5A) 25 min

Actual Bottom Time 35 min

EBT 1.2 (a) x 35 (b) = 42 (c)

DIVE SCHEDULE: 60 fsw/ 42 (c) min

Decompression required: ☑ Yes ☐ No

_____fsw _____min

_____fsw _____min

_____fsw _____min O_2 Stop (If Table 2A)

10 fsw 10 min _____fsw _____min

Repetitive Group H (Table 3A)

Figure 1. Example of Repetitive Dive Calculations

Example 4:

First dive is 60 fsw for 35 min. **SI** is 15 min.
Second dive is 60 fsw for 20 min. **EBT** is 35 + 20 = 55 min.
Decompression required is 10 min at 10 fsw from Table 1A (**RG** = **I**).

(ii) **If the depths of the first and second dives are different**, take the **RG** of the first dive, find the bottom time of the corresponding or higher **RG** at the second dive depth. Add the intended bottom time of the second dive to this value to calculate the **EBT** for the second dive.

Example 5:

First dive is 120 fsw for 10 min. **RG = D**.
SI is 15 min; Second dive planned is 70 fsw for 15 min.
Group **D** dive at 70 fsw has an equivalent bottom time of 20 min.
Therefore, the **EBT** for second dive is 20 + 15 = 35 min.
Decompression required is 11 min at 10 fsw from Table 1A.

4. DESCENT/ASCENT RATES AND VARIATIONS

a. **DESCENT** rate - 60 fsw/min or slower.

b. **ASCENT** rate and **TRAVEL** rate between stops is 60 ± 10 fsw/min.

c. Ascent **TOO SLOW**: (Less than 50 fsw/min)

(1) Delay **deeper** than half the maximum depth: delay **added** to **bottom time**.

(2) Delay **shallower** than half the maximum depth: delay **added** to actual **stop time** of next stop.

(3) After a delay has occurred, the depth of the delay is considered to be the restart point for calculating the ascent time to the first stop.

d. Ascent to first stop **TOO FAST**.
No correction required (actual stop time equals "tabulated" stop time **minus** actual travel time).

e. Ascent **TOO FAST** (for no stop dives).
Observe diver for one hour.

5. FLYING AFTER DIVING

a. Exposure to hypobaric conditions in altitude chamber is restricted to 72 hours after diving.

b. For flight in aircraft, follow CF recommendations.[1]

---

[1] *Diving in the Canadian Forces*, Article 130. B-GG-380-000/FP-002, 1983-01-17

SECTION 3 - ANALYSIS OF TREATMENT TABLES

The use of the USN Treatment Tables, which are designed for use at sea level, at reduced atmospheric pressures such as at CFSAT Edmonton places the treatment tender at some risk of decompression sickness. Diving to 60 ft at the elevation of CFSAT Edmonton is equivalent to diving to approximately 70 fsw at sea level. Similarly, diving to 165 ft on Table 6A is equivalent to diving to approximately 185 fsw at sea level.

The US Air Force has modified the USN Treatment Tables to increase the safety of the attendants in the treatment by requiring oxygen breathing towards the end of the tables. These modifications are:

1. For Treatment Table 6, oxygen is required for the tender for the last 20 min at 30 ft and from 30 ft to the surface;
2. For Treatment Table 6A, oxygen is required for the tender for 40 min at 30 ft (with a 5 min air break after 20 min) and from 30 ft to the surface; and
3. For Treatment Table 5, oxygen is required for the tender during the travel time from 30 ft to surface.

An analysis, based on the DCIEM 1983 decompression model, of Treatment Tables 6, 6A and 5 was conducted for the altitude of CFSAT Edmonton. The results of this analysis are shown in Figures 2 to 4.

Figures 2 and 3 show Treatment Tables 6 and 6A with extensions. The recommended oxygen breathing period is indicated by the shaded region in each figure. The safe ascent depth for each profile is shown for air only as the breathing gas and with oxygen as the breathing gas. For safe decompression, the safe ascent depth must reach zero (surface).

The analysis shows that in each case, for air only, the safe ascent depth is a positive value at the end of the treatment table, indicating that the decompression requirements have not been completed. Therefore, with air only, the treatment tables are not safe for the attendant. For Table 6, between 43 and 70 min of additional decompression at 10 ft are required (depending on the extensions). For Table 6A, the additional decompression required varies from 124 min to 144 min at 10 ft.

If oxygen is breathed at the end of each treatment table, however, the safe ascent depth reaches zero at least 20 min before the end of the treatment schedule in all cases. Thus, with oxygen breathing, the decompression requirements are completed for both Treatment Tables 6 and 6A.

Figure 4 shows the profile and the safe ascent depth for Table 5. For this particular table, the safe ascent depth reaches zero at 90 min while the attendant is still on air even at the altitude of CFSAT Edmonton.

In conclusion, the analysis shows that oxygen breathing, as recommended in the USAF procedure, is essential for the safety of the treatment attendant for Tables 6 and 6A. Although the analysis shows that oxygen is not strictly necessary for Table 5, oxygen breathing provides an additional safety factor for the attendant and for that reason, is recommended.

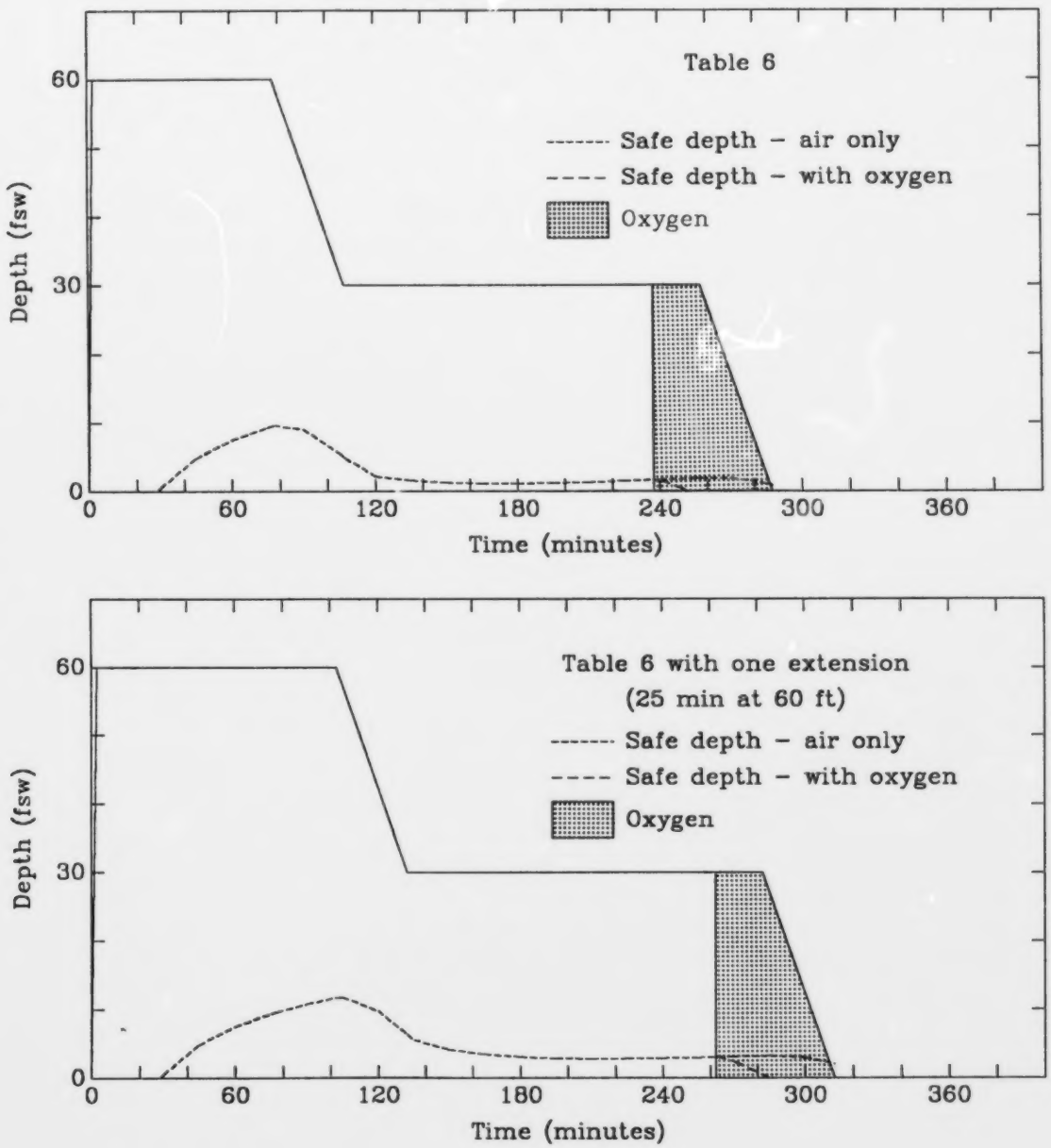

Fig. 2(a). Analysis of Treatment Table 6 and Table 6 with one extension at 60 ft with and without oxygen breathing (for altitude of CFSAT Edmonton).

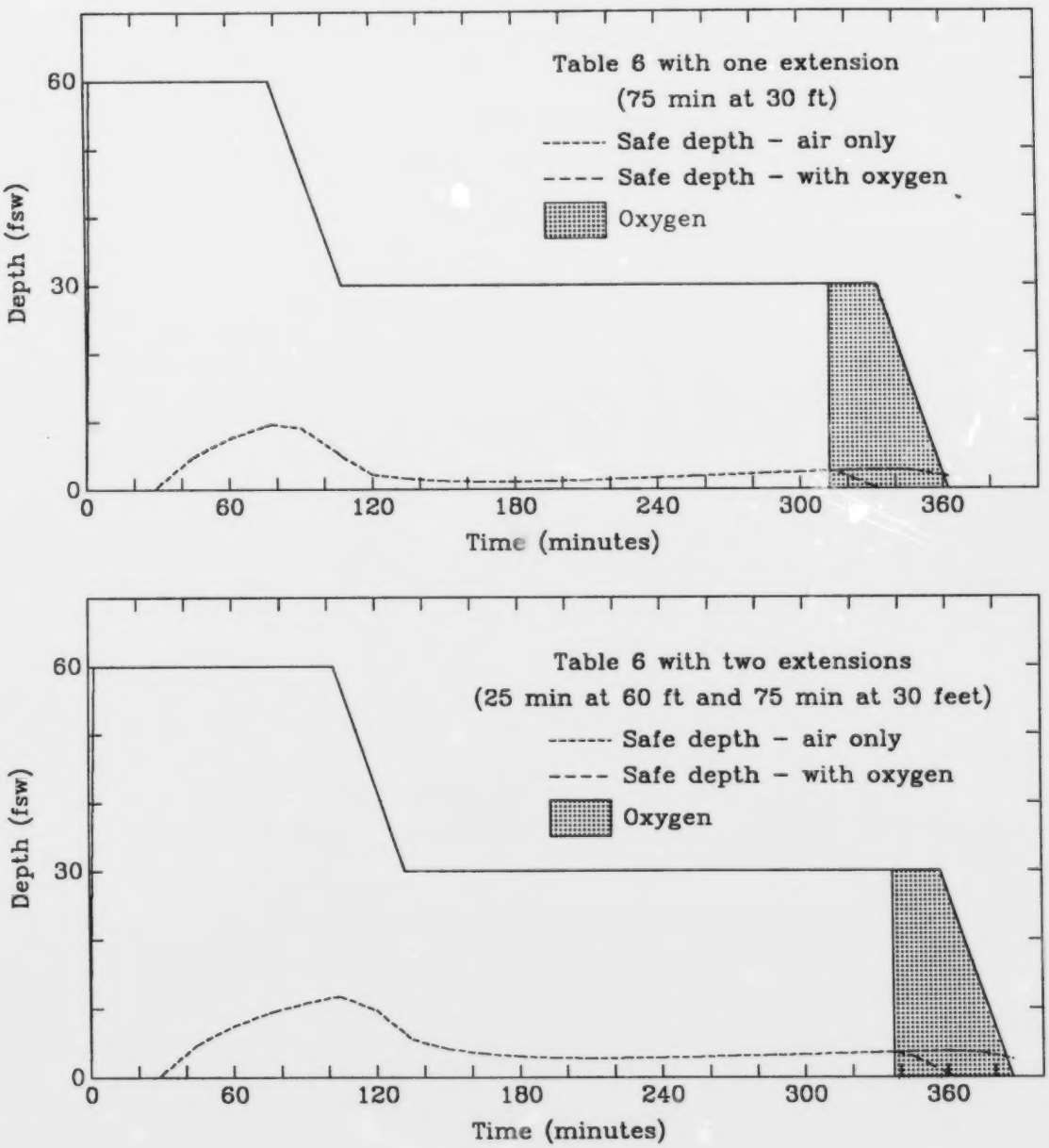

Fig. 2(b). Analysis of Treatment Table 6 with one extension at 30 ft and with two extensions with and without oxygen breathing (for altitude of CFSAT Edmonton).

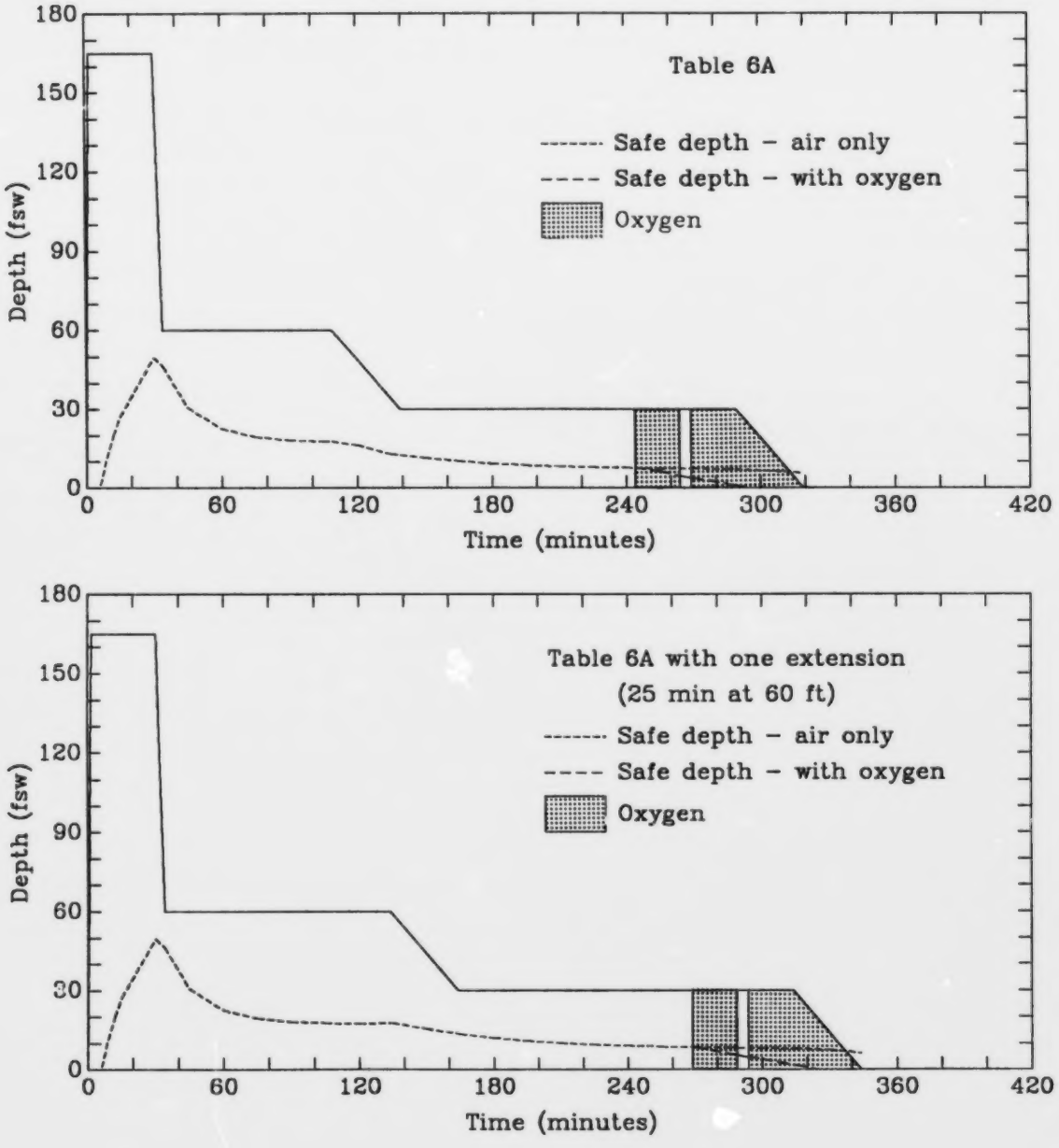

Fig. 3(a). Analysis of Treatment Table 6A and Table 6A with one extension at 60 ft with and without oxygen breathing (for altitude of CFSAT Edmonton).

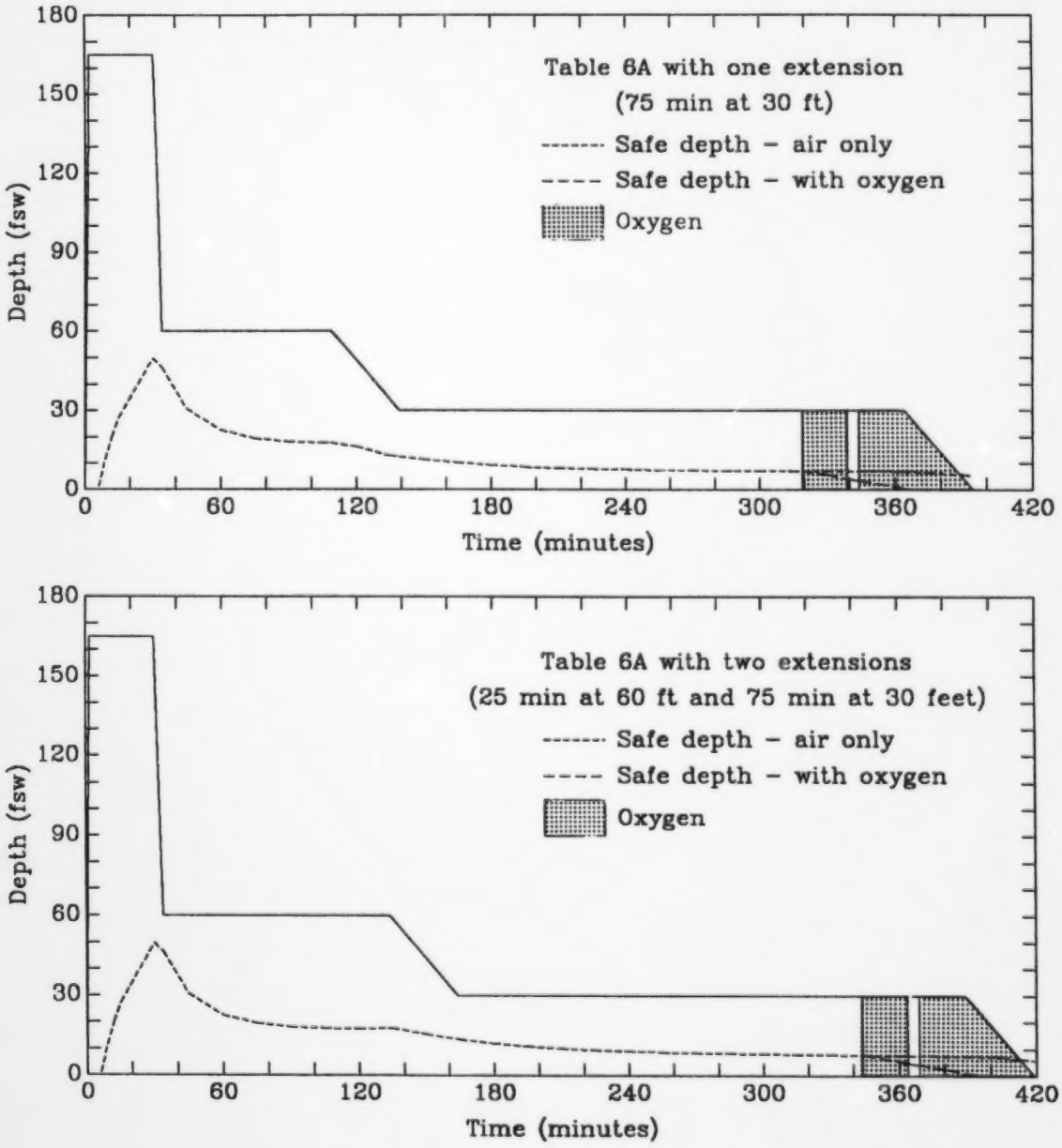

Fig. 3(b). Analysis of Treatment Table 6A with one extension at 30 ft and with two extensions with and without oxygen breathing (for altitude of CFSAT Edmonton).

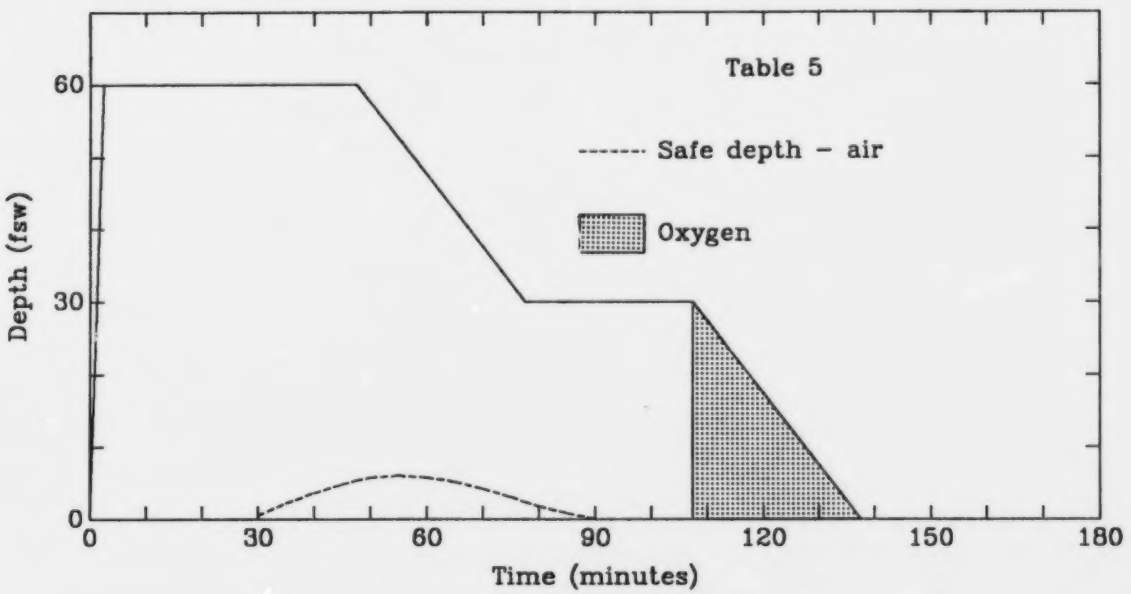

Fig. 4. Analysis of Treatment Table 5 with and without oxygen breathing (for altitude of CFSAT Edmonton).

APPENDIX I

DCIEM 1983

ALTITUDE-CORRECTED AIR DIVING TABLE 1A (FEET)

FOR CFSAT EDMONTON

STANDARD AIR

DCIEM 1983
ALTITUDE-CORRECTED AIR DIVING TABLE 1A (FEET)
FOR CFSAT EDMONTON
STANDARD AIR

Depth (fsw)	Bottom Time (min)	Stop Times (min) at Different Depths (fsw)							Decom. Time (min)
		70	60	50	40	30	20	10	
30	300	-	-	-	-	-	-	-	-
	310	-	-	-	-	-	-	7	7
	320	-	-	-	-	-	-	11	11
	330	-	-	-	-	-	-	14	14
	360	-	-	-	-	-	-	22	22
40	105	-	-	-	-	-	-	-	-
	120	-	-	-	-	-	-	2	2
	150	-	-	-	-	-	-	4	4
	160	-	-	-	-	-	-	10	10
	170	-	-	-	-	-	-	16	16
	180	-	-	-	-	-	-	21	21
50	45	-	-	-	-	-	-	-	-
	60	-	-	-	-	-	-	4	4
	80	-	-	-	-	-	-	7	7
	100	-	-	-	-	-	-	10	10
	110	-	-	-	-	-	-	19	19
	120	-	-	-	-	-	-	25	25
	130	-	-	-	-	-	-	31	31
	140	-	-	-	-	-	-	36	36
60	30	-	-	-	-	-	-	-	-
	40	-	-	-	-	-	-	6	6
	60	-	-	-	-	-	-	10	10
	70	-	-	-	-	-	-	12	12
	80	-	-	-	-	-	-	21	21
	90	-	-	-	-	-	2	28	30
	100	-	-	-	-	-	3	35	38
	110	-	-	-	-	-	3	42	45
	120	-	-	-	-	-	4	49	53
70	21	-	-	-	-	-	-	-	-
	25	-	-	-	-	-	-	4	4
	30	-	-	-	-	-	-	7	7
	40	-	-	-	-	-	-	11	11
	50	-	-	-	-	-	2	12	14
	60	-	-	-	-	-	4	18	22
	65	-	-	-	-	-	5	23	28
	70	-	-	-	-	-	5	28	33
	75	-	-	-	-	-	6	32	38
	80	-	-	-	-	-	7	35	42
	85	-	-	-	-	-	7	40	47
	90	-	-	-	-	-	8	44	52

Descent rate is 60 feet seawater (fsw)/min or slower.
Ascent rate and travel between stops are at 60 ± 10 fsw/min.
Ascent time to a stop is included in the stop time.

DCIEM 1983
ALTITUDE-CORRECTED AIR DIVING TABLE 1A (FEET)
FOR CFSAT EDMONTON
STANDARD AIR

Depth (fsw)	Bottom Time (min)	Stop Times (min) at Different Depths (fsw)							Decom. Time (min)
		70	60	50	40	30	20	10	
80	16	-	-	-	-	-	-	-	-
	20	-	-	-	-	-	-	5	5
	30	-	-	-	-	-	-	11	11
	40	-	-	-	-	-	4	12	16
	45	-	-	-	-	-	5	13	18
	50	-	-	-	-	-	7	19	26
	55	-	-	-	-	-	8	25	33
	60	-	-	-	-	-	9	30	39
90	13	-	-	-	-	-	-	-	-
	15	-	-	-	-	-	-	4	4
	20	-	-	-	-	-	-	8	8
	25	-	-	-	-	-	-	12	12
	30	-	-	-	-	-	4	11	15
	35	-	-	-	-	-	6	12	18
	40	-	-	-	-	-	8	15	23
	45	-	-	-	-	-	9	24	33
	50	-	-	-	-	2	9	30	41
	55	-	-	-	-	3	9	36	48
100	11	-	-	-	-	-	-	-	-
	15	-	-	-	-	-	-	7	7
	20	-	-	-	-	-	-	12	12
	25	-	-	-	-	-	5	11	16
	30	-	-	-	-	-	8	12	20
	35	-	-	-	-	-	10	17	27
	40	-	-	-	-	3	9	25	37
	45	-	-	-	-	5	9	33	47
	50	-	-	-	-	6	10	39	55
	55	-	-	-	-	7	10	46	63
110	9	-	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	3	3
	15	-	-	-	-	-	-	10	10
	20	-	-	-	-	-	5	10	15
	25	-	-	-	-	-	8	12	20
	30	-	-	-	-	3	8	16	27
	35	-	-	-	-	5	9	26	40
	40	-	-	-	-	7	9	34	50
	45	-	-	-	-	8	10	42	60
	50	-	-	-	2	7	11	50	70

DCIEM 1983
ALTITUDE-CORRECTED AIR DIVING TABLE 1A (FEET)
FOR CFSAT EDMONTON
STANDARD AIR

Depth (fsw)	Bottom Time (min)	Stop Times (min) at Different Depths (fsw)							Decom. Time (min)
		70	60	50	40	30	20	10	
120	8	-	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	5	5
	15	-	-	-	-	-	3	10	13
	20	-	-	-	-	-	8	11	19
	25	-	-	-	-	3	8	13	24
	30	-	-	-	-	6	9	24	39
	35	-	-	-	-	8	9	33	50
	40	-	-	-	3	7	10	42	62
	45	-	-	-	4	8	11	51	74
130	7	-	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	7	7
	15	-	-	-	-	-	5	11	16
	20	-	-	-	-	3	7	12	22
	25	-	-	-	-	6	9	19	34
	30	-	-	-	2	7	9	31	49
	35	-	-	-	4	7	10	41	62
	40	-	-	-	6	7	11	51	75
140	7	-	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	10	10
	15	-	-	-	-	-	8	10	18
	20	-	-	-	-	5	8	13	26
	25	-	-	-	3	6	9	26	44
	30	-	-	-	5	7	10	37	59
	35	-	-	-	7	7	11	49	74
150	5	-	-	-	-	-	-	-	-
	10	-	-	-	-	-	-	12	12
	15	-	-	-	-	3	7	11	21
	20	-	-	-	-	8	8	18	34
	25	-	-	-	5	6	10	32	53
	30	-	-	-	7	7	11	44	69
160	5	-	-	-	-	-	-	-	-
	10	-	-	-	-	-	5	9	14
	15	-	-	-	-	5	8	11	24
	20	-	-	-	4	6	9	24	43
	25	-	-	-	7	7	10	38	62
	30	-	-	4	6	7	12	52	81
170	5	-	-	-	-	-	-	-	-
	8	-	-	-	-	-	-	11	11
	10	-	-	-	-	-	7	10	17
	13	-	-	-	-	5	7	11	23
	15	-	-	-	-	7	8	12	27
	17	-	-	-	3	6	9	18	36
	20	-	-	-	6	6	9	30	51
	25	-	-	4	5	8	10	45	72
	30	-	-	6	6	8	15	59	94

APPENDIX II

DCIEM 1983

ALTITUDE-CORRECTED AIR DIVING TABLE 2A (FEET)

FOR CFSAT EDMONTON

OXYGEN DECOMPRESSION AT 30 FSW

DCIEM 1983
ALTITUDE-CORRECTED AIR DIVING TABLE 2A (FEET)
FOR CFSAT EDMONTON
OXYGEN DECOMPRESSION AT 30 FEET

Depth (fsw)	Bottom Time (min)	Stop Times (min) at Different Depths (fsw)						Decom. Time (min)
		Air					O_2	
		80	70	60	50	40	30	
50	45	-	-	-	-	-	-	-
	90	-	-	-	-	-	5	6
	110	-	-	-	-	-	12	13
	120	-	-	-	-	-	15	16
	130	-	-	-	-	-	19	20
	140	-	-	-	-	-	22	23
60	30	-	-	-	-	-	-	-
	50	-	-	-	-	-	5	6
	70	-	-	-	-	-	7	8
	80	-	-	-	-	-	13	14
	90	-	-	-	-	-	19	20
	100	-	-	-	-	-	23	24
	110	-	-	-	-	-	26	27
	120	-	-	-	-	-	30	31
70	21	-	-	-	-	-	-	-
	40	-	-	-	-	-	6	8
	60	-	-	-	-	-	13	15
	65	-	-	-	-	-	17	19
	70	-	-	-	-	-	20	22
	75	-	-	-	-	-	23	25
	80	-	-	-	-	-	25	27
	85	-	-	-	-	-	28	30
	90	-	-	-	-	-	30	32
80	16	-	-	-	-	-	-	-
	30	-	-	-	-	-	6	8
	40	-	-	-	-	-	9	11
	50	-	-	-	-	-	15	17
	55	-	-	-	-	-	20	22
	60	-	-	-	-	-	24	26
90	13	-	-	-	-	-	-	-
	20	-	-	-	-	-	5	7
	30	-	-	-	-	-	9	11
	40	-	-	-	-	-	13	15
	45	-	-	-	-	-	20	22
	50	-	-	-	-	-	24	26
	55	-	-	-	-	-	28	30

Descent rate is 60 feet seawater (fsw)/min or slower.
Ascent rate and travel between stops are at 60 ± 10 fsw/min.
All air stops include the ascent time to the stops.
O_2 stop at 30 fsw does not include ascent time to 30 fsw.
O_2 stop time starts after the diver reaches 30 fsw and is confirmed on O_2.

DCIEM 1983
ALTITUDE-CORRECTED AIR DIVING TABLE 2A (FEET)
FOR CFSAT EDMONTON
OXYGEN DECOMPRESSION AT 30 FEET

Depth (fsw)	Bottom Time (min)	Stop Times (min) at Different Depths (fsw)						Decom. Time (min)
		Air					O_2	
		80	70	60	50	40	30	
100	11	-	-	-	-	-	-	-
	20	-	-	-	-	-	7	9
	30	-	-	-	-	-	11	13
	35	-	-	-	-	-	14	16
	40	-	-	-	-	-	22	24
	45	-	-	-	-	-	27	29
	50	-	-	-	-	-	32	34
	55	-	-	-	-	-	36	38
110	9	-	-	-	-	-	-	-
	15	-	-	-	-	-	5	7
	20	-	-	-	-	-	9	11
	25	-	-	-	-	-	11	13
	30	-	-	-	-	-	13	15
	35	-	-	-	-	-	23	25
	40	-	-	-	-	-	29	31
	45	-	-	-	-	-	34	36
	50	-	-	-	-	2	39	42
120	8	-	-	-	-	-	-	-
	15	-	-	-	-	-	7	9
	25	-	-	-	-	-	13	15
	30	-	-	-	-	-	22	24
	35	-	-	-	-	-	29	31
	40	-	-	-	-	3	35	39
	45	-	-	-	-	4	40	45
130	7	-	-	-	-	-	-	-
	10	-	-	-	-	-	4	7
	15	-	-	-	-	-	9	12
	20	-	-	-	-	-	12	15
	25	-	-	-	-	-	18	21
	30	-	-	-	-	2	28	31
	35	-	-	-	-	4	34	39
	40	-	-	-	-	6	40	47
140	7	-	-	-	-	-	-	-
	10	-	-	-	-	-	5	8
	15	-	-	-	-	-	10	13
	20	-	-	-	-	-	14	17
	25	-	-	-	-	3	24	28
	30	-	-	-	-	5	32	38
	35	-	-	-	-	7	39	47

DCIEM 1983
ALTITUDE-CORRECTED AIR DIVING TABLE 2A (FEET)
FOR CFSAT EDMONTON
OXYGEN DECOMPRESSION AT 30 FEET

Depth (fsw)	Bottom Time (min)	Stop Times (min) at Different Depths (fsw)						Decom. Time (min)
		Air					O_2	
		80	70	60	50	40	30	
150	5	-	-	-	-	-	-	-
	10	-	-	-	-	-	7	10
	15	-	-	-	-	-	12	15
	20	-	-	-	-	-	16	19
	25	-	-	-	-	5	29	35
	30	-	-	-	-	7	37	45
160	5	-	-	-	-	-	-	-
	10	-	-	-	-	-	8	11
	15	-	-	-	-	-	13	16
	20	-	-	-	-	4	22	27
	25	-	-	-	-	7	33	41
	30	-	-	-	4	6	41	52
170	5	-	-	-	-	-	-	-
	8	-	-	-	-	-	6	9
	10	-	-	-	-	-	9	12
	13	-	-	-	-	-	13	16
	15	-	-	-	-	-	15	18
	17	-	-	-	-	3	17	21
	20	-	-	-	-	6	27	34
	25	-	-	-	4	5	37	47
	30	-	-	-	6	6	45	58

APPENDIX III

DCIEM 1983

ALTITUDE-CORRECTED REPETITIVE DIVE TABLES

FOR CFSAT EDMONTON

TABLE 3A - REPETITIVE DIVE GROUPS (CFSAT EDMONTON)										
Depth (fsw)	Bottom Times (min) for Repetitive Groups (RG)									
	A	B	C	D	E	F	G	H	I	J
30	20	30	45	60	75	90	105	120	150	180
40	15	25	30	40	50	60	75	90	105	120
50	10	20	25	30	40	45	60	70	80	90
60	10	15	20	25	30	35	40	50	60	70
70	10	-	15	20	25	30	40	50	-	60
80	10	-	15	20	25	30	35	40	45	50
90	5	10	-	15	20	25	30	35	40	45
100	5	-	10	15	-	20	25	-	30	35
110	5	-	10	-	15	-	20	25	-	30
120	-	5	-	10	-	15	20	-	25	-
130	-	5	-	10	-	15	-	20	-	25
140	-	5	-	10	-	-	15	20	-	-
150	-	5	-	10	-	-	15	-	20	-
160	-	5	-	-	10	-	-	15	-	20
170	-	-	5	7	8	9	10	13	15	17

TABLE 4A - REPETITIVE DIVE FACTORS (CFSAT EDMONTON)									
Repetitive Group (RG)	Repetitive Factors (RF) for Surface Intervals (SI) in hr:min								
	0:30 →0:59	1:00 →1:29	1:30 →1:59	2:00 →2:59	3:00 →3:59	4:00 →5:59	6:00 →8:59	9:00 →11:59	12:00 →18:00
A	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0
B	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.0
C	1.4	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.0
D	1.5	1.4	1.3	1.3	1.2	1.2	1.1	1.1	1.0
E	1.6	1.5	1.4	1.3	1.3	1.2	1.2	1.1	1.1
F	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1.1
G	1.9	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1
H	-	1.9	1.7	1.6	1.5	1.4	1.3	1.1	1.1
I	-	2.0	1.8	1.7	1.5	1.4	1.3	1.1	1.1
J	-	-	1.9	1.8	1.6	1.5	1.3	1.2	1.1

TABLE 5A - ALLOWABLE LIMITS FOR NO-DECOMPRESSION REPETITIVE DIVES (CFSAT EDMONTON)											
Depth (fsw)	Allowable No-D Limits (min) for Repetitive Factors (RF)										RG
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	
30	270	250	230	210	200	185	175	165	157	150	-
40	95	87	80	75	70	65	61	58	53	52	I
50	41	37	34	32	30	28	26	25	23	22	F
60	27	25	23	21	20	18	17	16	15	15	E
70	20	18	17	16	15	14	13	12	11	11	E
80	15	13	12	11	10	10	9	9	8	8	D
90	12	11	10	9	8	8	7	7	7	7	D
100	10	9	8	8	7	7	6	6	6	6	D
110	8	7	7	6	6	5	5	5	5	5	D
120	7	6	6	6	5	5	5	4	4	4	D

APPENDIX IV

WORKSHEET FOR REPETITIVE DIVE CALCULATIONS

REPETITIVE DIVING WORKSHEET*

FIRST DIVE:

_____fsw/_____min

Repetitive Group_____ (Table 3A)

SECOND DIVE:

SI_____ hr _____min; RF_____(Table 4A)
(a)

Depth_____fsw

Allowable No-D Limit (Table 5A) _____min

Actual Bottom Time_____min
(b)

EBT_____ x _____ = _____
(a) (b) (c)

DIVE SCHEDULE: _____fsw/_____min
(c)

Decompression required: ☐ Yes ☐ No

_____fsw _____min

_____fsw _____min

_____fsw _____min O_2 Stop (if Table 2A)

_____fsw _____min _____fsw _____min

Repetitive Group_____ (Table 3A)

*For use only with CFSAT Edmonton Decompression Tables